Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Currently Amended) A method of creating an implant for treating joint disease, which method comprises:

obtaining from image data of a damaged or diseased joint information about the three-dimensional geometry of the joint, ~~wherein the information includes information on the thickness or shape of at least one of articular cartilage,~~ including normal and/or diseased articular cartilage~~,~~ and subchondral bone ~~to determine at least a portion of the geometry of an implant~~;

creating a three-dimensional electronic model of ~~the geometry of~~ at least a portion of the joint including normal and/or diseased articular cartilage and subchondral bone, wherein the model includes a geometry of at least a portion of an articular surface of the joint; and

creating an implant based on the three-dimensional model ~~of the joint~~, wherein at least a portion of said implant has an outer articular surface ~~based on the~~ derived ~~information~~ from the geometry of at least a portion of the articular surface of the joint.

2. – 6. (Cancelled)

7. (Previously Presented) The method of claim 1, wherein said image data is ultrasound data, computed tomography data, positron emission tomography data, a single photon emission computed tomography scan, or MRI data.

8. – 9. (Cancelled)

10. (Currently Amended) A method of creating an implant for treating joint disease, which method comprises:

obtaining from image data of a damaged or diseased joint information about the three-dimensional geometry of the joint, wherein the information includes information on the thickness

of articular cartilage, including normal cartilage;

creating a three-dimensional electronic model of ~~the geometry of~~ at least a portion of the joint wherein the model includes a geometry of at least a portion of an articular surface of the joint; and

creating, based at least in part on the model, an implant having an outer articular surface derived at least in part based on the thickness of the normal articular cartilage.

11. – 14. (Cancelled)

15. (Previously Presented) The method of claim 10, wherein said image data is ultrasound data, computed tomography data, positron emission tomography data, a single photon emission computed tomography scan, or MRI data.

16. – 17. (Cancelled)

18. (Previously Presented) The method of claim 10, wherein said implant is configured to repair an area of diseased articular cartilage as well as adjacent normal tissue.

19. (Previously Presented) The method of claim 18, wherein said adjacent normal tissue is bone, bone marrow, or normal articular cartilage.

20. (Previously Presented) The method of claim 10, wherein said implant is created with use of a 3D Euclidian distance transformation.

21. (Previously Presented) The method of claim 10, wherein at least a portion of said implant is configured to be implantable into a knee joint.

22. (Previously Presented) The method of claim 10, wherein said implant further comprises cartilage cells or cartilage matrix.

23. – 54. (Cancelled)

55. (Previously Presented) The method of claim 1, wherein said implant is configured to repair an area of said diseased articular cartilage as well as adjacent normal tissue.

56. (Previously Presented) The method of claim 55, wherein the adjacent normal tissue is at least one of bone, bone marrow, and normal articular cartilage.

57. (Previously Presented) The method of claim 1, wherein the implant is configured to repair an area encompassing at least a portion of said diseased articular cartilage.

58. (Previously Presented) The method of claim 1, wherein the implant is configured to repair an area encompassing at least a portion of said normal articular cartilage.

59. (Previously Presented) The method of claim 1, wherein the implant is created with use of a 3D Euclidian distance transform.

60. (Previously Presented) The method of claim 1, wherein at least a portion of said implant is configured to be implantable into a knee joint.

61. (Previously Presented) The method of claim 1, wherein the implant further comprises cartilage cells or cartilage matrix.

62. – 65. (Cancelled)

66. (Previously Presented) The method of claim 10, wherein said implant is also based on a contact pattern.

67. (Previously Presented) The method of claim 66, wherein said contact pattern is derived from static alignment.

68. (Previously Presented) The method of claim 66, wherein said contact pattern is derived from dynamic loading.

69. (Previously Presented) The method of claim 68, wherein said dynamic loading is estimated for gait.

70. (Previously Presented) The method of claim 66, wherein said contact pattern is derived on an image.

71. (Previously Presented) The method of claim 66, wherein said contact pattern is derived in three dimensions.

72. – 84. (Cancelled)

85. (Previously Presented) The method of claim 10, wherein the implant is configured to repair an area encompassing at least a portion of said diseased articular cartilage.

86. (Previously Presented) The method of claim 10, wherein the implant is configured to repair an area encompassing at least a portion of said normal articular cartilage.

87. – 93. (Cancelled)

94. (Previously Presented) The method of claim 1, wherein said derived information includes information on normal and diseased articular cartilage in at least one portion of the joint.

95. (Previously Presented) The method of claim 1, wherein said derived information includes

information on normal articular cartilage adjacent to diseased articular cartilage in at least one portion of the joint.

96. (Previously Presented) The method of claim 1, wherein the step of creating an implant further includes creating a thickness of a portion of said implant is substantially similar to a thickness of said normal articular cartilage in at least one portion of the joint.

97. (Previously Presented) The method of claim 1, wherein the step of creating an implant further includes creating a thickness of a portion of said implant that is fixed and substantially similar to a thickness of said normal articular cartilage in at least one portion of the joint.

98. (Previously Presented) The method of claim 1, wherein the step of creating an implant further includes creating a thickness of a portion of said implant that is substantially similar to a thickness of said normal articular cartilage adjacent to diseased articular cartilage in at least one portion of the joint.

99. (Previously Presented) The method of claim 1, wherein said implant is configured to be located in at least one of a medial femoral condyle, a lateral femoral condyle, or both femoral condyles of the joint.

100. (Previously Presented) The method of claim 1, wherein said implant is configured to be located in at least one femoral condyle and the notch region of a joint.

101. (Previously Presented) The method of claim 1, wherein said implant is configured to be located in at least one of a medial tibial plateau, a lateral tibial plateau, or an entire tibial plateau of the joint.

102. (Previously Presented) The method of claim 1, wherein said implant is configured to be located in at least one of a medial patella, a lateral patella, an entire patella, or an entire joint.

103. (Previously Presented) The method of claim 1, wherein said implant is configured based on an isosurface of said subchondral bone.

104. (Previously Presented) The method of claim 1, wherein said implant is based on polygons.

105. (Previously Presented) The method of claim 104, wherein said polygons are derived using a tessellation.

106. (Previously Presented) The method of claim 10, wherein said derived information includes information on normal and diseased articular cartilage in at least one portion of the joint.

107. (Previously Presented) The method of claim 10, wherein said derived information includes information on normal articular cartilage adjacent to diseased articular cartilage in at least one portion of the joint.

108. (Previously Presented) The method of claim 10, wherein the step of creating an implant further comprises creating a thickness of a portion of said implant is substantially similar to a thickness of said normal articular cartilage in at least one portion of the joint.

109. (Previously Presented) The method of claim 10, wherein the step of creating an implant further comprises creating a thickness of a portion of said implant is fixed and the fixed thickness is substantially similar to a thickness of said normal articular cartilage in at least one portion of the joint.

110. (Previously Presented) The method of claim 10, wherein the step of creating an implant further comprises creating a thickness of a portion of said implant is substantially similar to a thickness of said normal articular cartilage adjacent to diseased articular cartilage in at least one portion of the joint.

111. (Previously Presented) The method of claim 10, wherein said implant is configured to be located in at least one of a medial femoral condyle, a lateral femoral condyle, or both femoral condyles of the joint.

112. (Previously Presented) The method of claim 10, wherein said implant is configured to be located in at least one femoral condyle and the notch region of the joint.

113. (Previously Presented) The method of claim 10, wherein said implant is configured to be located in at least one of a medial tibial plateau, a lateral tibial plateau, or an entire tibial plateau of the joint.

114. (Previously Presented) The method of claim 10, wherein said implant is configured to be located in at least one of a medial patella, a lateral patella, an entire patella, or an entire joint of the joint.

115. (Previously Presented) The method of claim 1, wherein said implant is also based on a contact pattern.

116. (Previously Presented) The method of claim 115, wherein said contact pattern is derived from static alignment.

117. (Previously Presented) The method of claim 115, wherein said contact pattern is derived from dynamic loading.

118. (Previously Presented) The method of claim 117, wherein said dynamic loading is estimated for gait.

119. (Previously Presented) The method of claim 115, wherein said contact pattern is derived on

an image.

120. (Previously Presented) The method of claim 115, wherein said contact pattern is derived in three dimensions.

121. (Previously Presented) The method of claim 10, wherein said implant is configured to repair an area encompassing bone or bone marrow.

122. (Previously Presented) The method of claim 10, wherein said image data undergoes a segmentation.

123. (Previously Presented) The method of claim 122, wherein said segmentation is used to segment articular cartilage.

124. (Previously Presented) The method of claim 123, wherein said articular cartilage is normal cartilage.

125. (Previously Presented) The method of claim 123, wherein said articular cartilage is diseased cartilage.

126. (Previously Presented) The method of claim 122, wherein said segmentation is used to segment bone.

127. (Cancelled)

128. (Currently Amended) The method of claim ~~127~~ 10, wherein said three-dimensional model includes one or more static relationship transformations between a femur and tibia of the joint.

129. (Currently Amended) The method of claim ~~127~~ 10, wherein said three-dimensional model

includes at least one sequence of transformations between a femur and tibia of the joint.

130. (Currently Amended) The method of claim ~~127~~ 10, wherein said three-dimensional model is merged with one or more load alignment estimations.

131. (Previously Presented) The method of claim 130, wherein said one or more load alignment estimations include at least one of load alignment in standing or weight-bearing position, load alignment in lying or non-weight-bearing position, and load alignment during joint motion.

132. (Previously Presented) The method of claim 10, wherein a thickness of said implant is derived from a thickness of cartilage at an implantation site.

133. (Previously Presented) The method of claim 10, wherein a curvature of the outer surface of said implant is derived from a curvature of a surface of an implantation site.

134. (Previously Presented) The method of claim 10, wherein said information on the thickness of articular cartilage, including normal and/or diseased cartilage, includes information of articular cartilage defects.

135. (Previously Presented) The method of claim 134, wherein said obtaining information includes evaluating a region of said articular cartilage defect and contiguous parts of said articular cartilage surrounding said region of said articular cartilage defect.

136. (Previously Presented) The method of claim 134, wherein said information of articular cartilage defects is used to determine one or more dimensions of said implant.

137. (Previously Presented) The method of claim 1, wherein said implant is configured to repair an area encompassing bone or bone marrow.

138. (Previously Presented) The method of claim 1, wherein said image data undergoes a segmentation.

139. (Previously Presented) The method of claim 138, wherein said segmentation is used to segment articular cartilage.

140. (Previously Presented) The method of claim 139, wherein said articular cartilage is normal cartilage.

141. (Previously Presented) The method of claim 139, wherein said articular cartilage is diseased cartilage.

142. (Previously Presented) The method of claim 138, wherein said segmentation is used to segment bone.

143. (Cancelled)

144. (Currently Amended) The method of claim ~~143~~ 1, wherein said three-dimensional model includes one or more static relationship transformations between a femur and tibia of the joint.

145. (Currently Amended) The method of claim ~~143~~ 1, wherein said three-dimensional model includes at least one sequence of transformations between a femur and tibia of the joint.

146. (Currently Amended) The method of claim ~~143~~ 1, wherein said three-dimensional model is merged with one or more load alignment estimations.

147. (Previously Presented) The method of claim 146, wherein said one or more load alignment estimations include at least one of load alignment in standing or weight-bearing position, load alignment in lying or non-weight-bearing position, and load alignment during joint motion.

148. (Previously Presented) The method of claim 1, wherein a thickness of said implant is derived from a thickness of cartilage at an implantation site.

149. (Previously Presented) The method of claim 1, wherein a curvature of the outer surface of said implant is derived from a curvature of a surface of an implantation site.

150. (Previously Presented) The method of claim 1, wherein said information on the thickness of articular cartilage, including normal and/or diseased cartilage, and subchondral bone includes information of articular cartilage defects.

151. (Previously Presented) The method of claim 150, wherein said obtaining information includes evaluating a region of said articular cartilage defect and contiguous parts of said articular cartilage surrounding said region of said articular cartilage defect.

152. (Previously Presented) The method of claim 150, wherein said information of articular cartilage defects is used to determine one or more dimensions of said implant.

153. (Currently Amended) A method of forming a physical model for repairing a joint which method comprises:

~~obtain~~ obtaining from image data of a joint information about the three-dimensional geometry of subchondral bone of the joint;

creating a three-dimensional electronic model of the geometry of at least a portion of the joint; and

forming, based at least in part on the model, a physical model having an outer articular surface shaped in at least a portion based on a curvature of the subchondral bone.

154 - 189. (Cancelled)

190. (Currently amended) A method of creating a device for treating an articular joint, which method comprises:

deriving from image data of a joint a geometry of at least a portion of a surface of subchondral bone of the joint;

creating a three-dimensional electronic model of the geometry of at least a portion of the joint;; and

creating, based at least in part on the model, a physical model of at least a portion of the joint, wherein the model has an outer surface configured as an articular surface and having at least a portion configured from the geometry of the subchondral bone.

191 - 227. (Cancelled)

228. (Previously Presented) The method of claim 153, wherein the physical model comprises a bone replacement material.

229. (Previously Presented) The method of claim 153, wherein at least a portion of the outer surface matches a curvature of the subchondral bone.

230. (Currently amended) The method of claim 229, [[.]] wherein at least a portion of the curvature is a three-dimensional curvature of the subchondral bone.

231. (Previously Presented) The method of claim 153, wherein at least a portion of the outer surface substantially matches the dimensions of diseased cartilage of the joint in at least one direction.

232. (Previously Presented) The method of claim 231, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the anteroposterior direction.

233. (Previously Presented) The method of claim 231, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the mediolateral direction.

234. (Previously Presented) The method of claim 231, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the superoinferior direction.

235. (Previously Presented) The method of claim 153, wherein the physical model further comprises an inner surface.

236. (Previously Presented) The method of claim 235, wherein at least a portion of the inner surface substantially matches the dimensions of diseased cartilage of the joint in at least one direction.

237. (Previously Presented) The method of claim 236, wherein at least a portion of the inner surface substantially matches the dimensions of the diseased cartilage of the joint in the anteroposterior direction.

238. (Previously Presented) The method of claim 236, wherein at least a portion of the inner surface substantially matches the dimensions of the diseased cartilage of the joint in the mediolateral direction.

239. (Previously Presented) The method of claim 190, wherein the physical model comprises a bone replacement material.

240. (Previously Presented) The method of claim 190, wherein at least a portion of the outer surface matches a curvature of the subchondral bone.

241. (Previously Presented) The method of claim 240, wherein the curvature is a three-dimensional curvature of the subchondral bone.

242. (Previously Presented) The method of claim 190, wherein at least a portion of the outer surface substantially matches the dimensions of diseased cartilage of the joint in at least one direction.

243. (Previously Presented) The method of claim 242, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the anteroposterior direction.

244. (Previously Presented) The method of claim 242, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the mediolateral direction.

245. (Previously Presented) The method of claim 242, wherein at least a portion of the outer surface substantially matches the dimensions of the diseased cartilage of the joint in the superoinferior direction.

246. (Previously Presented) The method of claim 190, wherein the physical model further comprises an inner surface.

247. (Previously Presented) The method of claim 246, wherein at least a portion of the inner surface substantially matches the dimensions of diseased cartilage of the joint in at least one direction.

248. (Previously Presented) The method of claim 247, wherein at least a portion of the inner surface substantially matches the dimensions of the diseased cartilage of the joint in the anteroposterior direction.

249. (Previously Presented) The method of claim 247, wherein at least a portion of the inner surface substantially matches the dimensions of the diseased cartilage of the joint in the mediolateral direction.

250. (Previously Presented) The method of claim 190, wherein the physical model is further based on a geometry of articular cartilage of the joint.

251. (Previously Presented) The method of claim 190, wherein the physical model is created by a digital manufacturing method.

252. (Previously Presented) The method of claim 251, wherein the digital manufacturing method is rapid prototyping.

253. (Previously Presented) The method of claim 190, wherein the physical model is created using a computer aided design system.

254. (Previously Presented) The method of claim 1, wherein the implant is created by a digital manufacturing method.

255. (Previously Presented) The method of claim 254, wherein the digital manufacturing method is rapid prototyping.

256. (Previously Presented) The method of claim 1, wherein the implant is created using a computer aided design system.